REMARKS

Claims 1-16 are pending herein. Claim 1 has been amended as supported by Fig. 1, for example. Attached hereto as page 8, pursuant to Rule 1.121(c)(1)(ii), is a marked-up version of the amended claim.

1. Claims 1-4, 6-9 and 13-15 were rejected under §103(a) over WO 98/05989/Watanabe et al. (U.S. Patent No. 6,045,269) (hereinafter "Watanabe"). To the extent that this rejection might be applied against amended claim 1, it is respectfully traversed.

With reference to Fig. 1 of the present application, claim 1 has been amended to recite that substrate 3 has flat surfaces arranged on opposite sides of a group of sectional V-shaped housing grooves 4, which are formed in the substrate. Claim 1 has been further amended to recite that adhesive layer 6 is provided directly between substrate 3 and cover plate 5.

Applicants discovered that delamination of the optical fiber array along peripheral areas (i.e., flat surfaces) on opposite sides of the V-grooves could be prevented by controlling the adhesive layer thickness (Y in the inequality recited in claim 1) between the substrate and the cover plate to be within a certain range. This is most clearly illustrated in Figs. 2(a)-(d) of the present application, which illustrate that the claimed invention prevents delamination of the claimed optical fiber array at the flat surface areas on opposite sides of the V-grooves. On the other hand, Figs. 2(e)-(h) clearly show that conventional optical fiber arrays, such as that disclosed in the prior art (discussed below), are prone to the above-discussed delamination problem at the peripheral areas on opposite sides of the V-grooves.

Contrary to the PTO's assertion in the Office Action, Watanabe explicitly teaches against a structure that would satisfy the inequality $L/6 \leq Y \leq L$ as recited in pending claim 1. For example, Fig. 4(b) of Watanabe shows that a clearance (not numbered), which corresponds to the thickness of the adhesive layer, exists between upper surface 24 of substrate 21 and pressing member 23. However, Watanabe further discloses that such a

clearance between upper surface 24 of substrate 21 and pressing member 23 decreases the likelihood of the optical connector functioning properly, in addition to adding to the cost of producing such an optical connector. That is, the clearance is unwanted because the optical fibers 4a, 4b at the end sides of the array are prone to being pulled outward by the adhesive agent coated in the clearance, for example, due to thermal contraction of the adhesive agent when the adhesive agent is hardened or the temperature changes (column 19, lines 17-43 of Watanabe '269). Therefore, Watanabe does not disclose or suggest an optical connector having a substrate that includes "flat surfaces arranged on opposite sides of a group of sectional V-shaped housing grooves," and having an adhesive layer thickness satisfying the inequality $L/6 \leq Y \leq L$ recited in pending independent claim 1. In fact, as explained above, Watanabe clearly teaches against the use of an adhesive layer having a thickness meeting the above inequality.[1] This rejection should be withdrawn for this reason alone.

Moreover, there is no disclosure anywhere in Watanabe that the thickness of the adhesive layer (e.g., Y in the inequality recited in claim 1) is critical at all, let alone near the peripheral areas on opposite sides of the group of V-shaped grooves formed in the substrate. In fact, as discussed above, Watanabe clearly teaches that the arraying accuracy of the optical fibers can be ensured if "almost no clearance" (which is defined in Watanabe as "almost no adhesive agent exists") is in existence between upper surface 24 of substrate 21 and pressing member 23 (see column 19, lines 17-29 of Watanabe '269). Again, Applicants discovered that controlling the adhesive layer thickness in the peripheral, flat areas on opposite sides of the V-grooves prevents delamination of the optical fiber array along the peripheral areas.

Furthermore, the Examiner's calculation attached to the Office Action measures a groove peak-to-pressing member distance, because the Examiner used groove pitch

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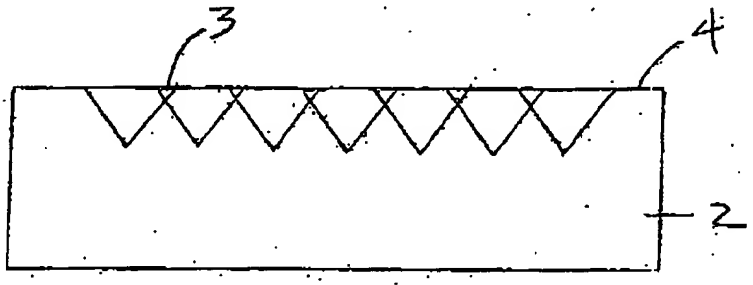
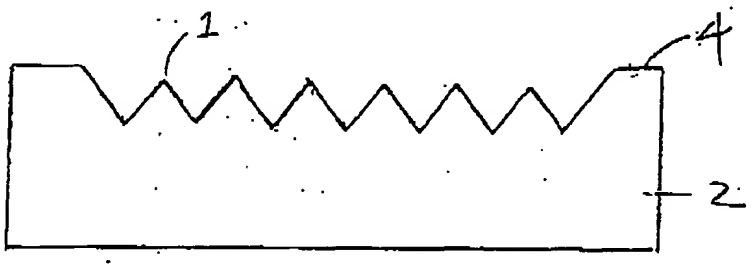
[1] See *In re Gurley*, 31 USPQ2d 1130 (CA FC 1994)("A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from foll wing the path set out in the reference, r would be led in a direction divergent from the path that was taken by the applicant.")

(127 ÷2 = 63.5 μm) as the starting point of his calculation. However, claim 1 recites the distance between the peripheral flat surfaces of the substrate and the pressing member. Applicants respectfully submit that the machining method used to cut grooves 22 into the glass substrate disclosed in Watanabe would not necessarily provide flat substrate surfaces on opposite sides of the V-grooves that are spaced the same distance from pressing member 23 as the peak of each groove. Thus, the adhesive layer thickness between upper surface 24 of substrate 21 and pressing member 23 (on opposite sides of the V-grooves) would not necessarily satisfy the inequality $L/6 \leq Y \leq L$ recited in pending claim 1 just because the groove peak-to-pressing member distance might satisfy the inequality.

Applicants respectfully submit that it is practically impossible to consistently machine the grooves such that adjacent peaks (positioned on opposite sides of V-grooves 22 shown in Fig. 4(b), for example) have the same or uniform height as the peripheral (original) surfaces of the substrate, due to unavoidable overlap between the successive machining steps used to form adjacent grooves. The drawings below illustrate this point.





With reference to the above drawings, in order to produce sharp peaks 1 having a reproducibly equal or uniform height with respect to the peripheral (original) surface 4, it would be required to machine or cut substrate 2 from groove-to-groove without any overlap between successive passes of the grinding tool (represented by portions 3). Even though the artist's depiction in Fig. 4(b) of Watanabe appears to show that the sharp peaks are cut to have substantially the same height with respect to one another, such a structure is, at best, highly unlikely, and in all probability, not practically possible.

In order to obtain the structure shown in Fig. 4(a) of Watanabe, which is the structure used for Watanabe's optical connector, overlapping portions of substrate 21 (i.e., those portions corresponding to overlapping portions 3 shown in the above drawing) have been cut out and removed during the machining process to yield a plurality of sharp peaks in which the height of each peak is located below the original surface plane of upper surface 24 of substrate 21. As such, the groove peak-to-pressing member distance does not equal the peripheral surface-to-pressing member distance, as claimed. Accordingly, there is no disclosure or suggestion in Watanabe of the $L/6 \leq Y \leq L$ inequality recited in pending claim 1.

In view of all of the foregoing, reconsideration and withdrawal of the §103(a) rejection over WO 98/05989/Watanabe '269 are respectfully requested.

2. Claims 1-3, 6, 7 and 13-15 were rejected under §103(a) over Ota et al. To the extent that this rejection might be applied against amended claim 1, it is respectfully traversed.

With reference to Fig. 13 of Ota, an optical transmitting member-holding structure includes fixing and holding substrates 104 and 128, respectively. A joining layer 129 includes a solder layer 130 sandwiched between metallizing layer 131 (formed on a lower surface of substrate 104) and metallizing layer 132 (formed on an upper surface of holding substrate 128). Because solder 130 is not an "adhesive" as claimed, and does not ***directly*** contact the fixing and holding substrates 104 and 128, respectively, there is no disclosure or

suggestion in Ota that an adhesive is "provided ***directly*** between the substrate and the cover plate," as is now recited in pending independent claim 1.

In view of the foregoing, reconsideration and withdrawal of the §103(a) rejection over Ota et al. are respectfully requested.

3. Claims 5, 10-12 and 16 were rejected under §103(a) over WO 98/05989/Watanabe '269 or Ota et al. in view of EP 0943942 (assigned to the same assignee as that of the present case). Applicants respectfully submit that the arguments submitted above distinguish claim 1 from WO '989/Watanabe '269 and Ota et al. Since EP '942 does not overcome the deficiencies of WO '989/Watanabe '269 and Ota et al., and since claims 5, 10-12 and 16 depend either directly or indirectly from claim 1, claims 5, 10-12 and 16 are also believed to be allowable over the applied art.

The Examiner is requested to confirm receipt and consideration of the Information Disclosure Statement filed November 27, 2002.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

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Date

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1. (Twice Amended) An optical fiber array, comprising: a holding member including a substrate having flat surfaces arranged on opposite sides of a group of sectional V-shaped housing grooves formed ~~thereon~~in said substrate for housing optical fibers on a top face, said optical fibers each having an optical fiber tip end bare portion housed in said holding member; a cover plate positioned on the substrate; and an adhesive provided directly between the substrate and the cover plate to fix the optical fibers in the housing grooves, wherein a distance between a center axis of the outermost housing groove and an end portion of the substrate is at least five times larger than the radium of the optical fibers, and a distance Y between the flat surfaces of the substrate and the cover plate is $L / 6 \leq Y \leq L$, wherein Y is a thickness of the adhesive and L is a distance from a contact point between the housed optical fibers and the housing grooves to the cover plate.

VERSION WITH MARKINGS TO SHOW CHANGES MADE
Amended claim